

FOSS

Environments

Concept and Lesson Map



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FOSS Concept and Lesson Map: Environments

The Big Picture

The six investigations introduce students to basic concepts in environmental biology. They discover conditions in both terrariums and aquariums that effect living organisms' abilities to thrive. Results from controlled experiments allow students to determine each organism's range of tolerance and optimum conditions.

Investigation 1: Terrestrial Environments

Goal: In order to survive in their environment, all living things need specific conditions.

Part 1: Setting Up Terrariums

Plant terrariums and create a map. Decide how much water the seeds/plants need to survive.

IQ: What environment factors affect the growth of seeds?

Part 2: Recording Changes

Periodically alter conditions as desired (water, placement, replant) and record actions/results.

IQ: How does the environment in the terrarium change over time?

Investigation 2: Bugs and Beetles

Goal: Every organism has a set of preferred environmental factors (conditions?).

Part 1: Making Animal Runways

Suggestion: make ahead of time.

IQ: What type of environment do isopods and beetles prefer?

Part 2: Responding to moisture

Conduct investigations to see the effect of moisture (dry, moist, wet) on the behavior of isopods and beetles.

IQ: How much moisture do isopods and beetles prefer?

Part 3: Responding to Light

Conduct investigations to see the effect of light levels on the behavior of isopods and beetles.

IQ: How do isopods and beetles respond to different amounts of light?

Part 4: Designing an Animal Investigation

Discuss, plan, and test additional environmental factors (e.g. food, shelter, temperature preferences, etc.) influencing isopods and beetles.

Investigation 3: Water Tolerance

Goal: Every organism has a range of tolerance for each environmental factor.

Part 1: Setting up Experiment

Plant different seed types in different soil moistures (dry, moist, wet, very wet).

IQ: What are the optimum water conditions and range of tolerance for each of the four plant types?

Part 2: Observing Plants at 5 and 8 days

Measure, record, and discuss evidence of growth (e.g. how many plants came up, height of tallest plant, etc.).

IQ: What changes in the plants have taken place over time?

Part 3: Observing Plants at 11 or More Days

Uproot plants and prepare FOSS Plant Profile to compare growth in the four soil moisture conditions.

IQ: What changes in the plants have taken place over time?

Investigation 4: Aquatic Environments

Goal: Organisms influence the environmental conditions.

Part 1: Goldfish Aquariums

Set up, observe, and discuss the environmental factors present/missing in aquarium.

IQ: What are two factors to consider when setting up a goldfish aquarium?

Part 2: Acid in Water

Use an indicator (BTB) to identify presence of acidity in water samples (with goldfish, Elodea plant and nothing added).

IQ: Do living organisms affect the quality of aquatic environments?

Part 3: New Organisms

Enrich aquariums, observe, and record changes.

IQ: What other organisms might live in the same environment as goldfish?

Investigation 5: Brine Shrimp Hatching

Goal: Every organism has a range of tolerance and optimum condition for each environmental factor.

Part 1: Setting Up the Experiment

Design and set up a controlled experiment to determine the effect of salinity on hatching.

IQ: How can we find out if salinity has an effect on brine shrimp hatching?

Part 2: Determining Range of Tolerance

Record, and discuss evidence of range of tolerance and optimum hatching-conditions.

IQ: What is the range of salinity in which brine shrimp eggs can hatch?

Part 3: Determining Viability

Manipulate salinity to see if unhatched eggs are viable.

IQ: Will unhatched eggs hatch when salinity is made optimum?

Investigation 6: Salt of the Earth

Goal: Every organism has a range of tolerance for each environmental factor.

Part 1: Setting Up the Experiment

Design and set up a controlled experiment to find evidence of the range of tolerance for salinity.

IQ: What is the salt tolerance of several common farm crops?

Part 2: Observing Plants

Measure, record, and discuss evidence of growth.

IQ: What changes in the plants can be observed over time?

Part 3: Choosing Your Own Investigation

Plan, conduct, and share results of a self-selected environments topic.

IQ: Students ask their own questions and plan how to answer them.